

Delaware and Raritan Canal: Lock (Deep Lock)
On the Delaware and Raritan Canal,
north of Hamilton Street, east of George Street,
and east of Middlesex Water Company Pumping Station
New Brunswick
Middlesex County
New Jersey

HAER No. NJ-60-A

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WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD

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Location: On the Delaware and Raritan Canal, north of Hamilton Street, east of George Street, and east of the Middlesex Water Company Pumping Station
New Brunswick, Middlesex County, New Jersey

USGS Quadrangle: Plainfield
UTM Coordinates: 18.547070.4483350

Present Owner: State of New Jersey

Present Use: Spillway for control of water supply to city of New Brunswick and Middlesex County.

Significance: Lock 13 was one of 14 locks in a canal totaling 65.5 miles in length, connecting the Raritan River at New Brunswick, New Jersey, to the Delaware River at Bordentown and at Raven Rock, New Jersey, facilitating navigation between New York and Philadelphia. Completed and open to navigation in 1834, the canal carried its peak traffic in 1871 and thereafter declined, succumbing to competition from the railroads. In December 1932, the canal ceased commercial operation and has since been utilized for water supply and recreational purposes. Except for a short segment in New Brunswick, which contains Lock 13, the Delaware and Raritan Canal is listed as an historic district on the National Register of Historic Places.

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PART I. HISTORICAL INFORMATION

The concept of constructing a navigable canal across the waist of New Jersey, to provide a safe and economical shipment of goods between New York City and Philadelphia, has been traced back to William Penn, when, in 1676, he authorized surveyors to determine the possibility of constructing a canal across the Jerseys from the Delaware River to New York Bay.

Nothing resulted from this authorization nor from a number of succeeding proposals made during the next century and a half until February 4, 1830, when the State of New Jersey granted a charter to the Delaware and Raritan Canal and Banking Company to construct an artificial waterway between the Delaware and Raritan Rivers. On the same day, a charter was granted to the Camden and Amboy Railroad and Transportation Company to construct a rail line across the waist of New Jersey in direct competition with the canal. Thus, the stage was set for the ultimate demise of the canal, a victim of railroad competition.

The outcome of the struggle perhaps could be foreseen in the fact that the railroad stock was fully subscribed the first day, whereas the canal stock sale was not completed until a full year later. In any event, the New Jersey legislature united the canal and railroad companies by an Act passed February 15, 1831, permitting each company to retain its own organization and officers but combining all revenues and expenditures. Meanwhile, the canal company was organized on May 10, 1830, at Trenton, with Commodore Robert F. Stockton as its first president. Stockton continued to head the company until his death in 1866, providing forceful leadership in the political battles to secure favorable legislation as well as in obtaining financial backing from diverse sources including London banks and financiers.

Canvass White, of Erie Canal fame, was appointed Chief Engineer, assisted by Ashbel Welch, Jr., who was appointed Engineer of the Western Division of the canal. George T. Olmstead served as Engineer of the Central Division, with John Hopkins heading up the Eastern Division, which included Lock 13. White died in 1834, the year of the canal's completion, with Welch succeeding him the following year as Chief Engineer of the combined companies, continuing to serve in that position until 1874.

In June 1830, Canvass White and several directors journeyed up the Delaware River to locate and survey the feeder canal, with its head at what is now Raven Rock. By mid-November 1830, construction commenced when a number of sections of the canal were placed under contract. With no major engineering difficulties to overcome, work proceeded steadily with pick, shovel, wheelbarrow, and horsedrawn scraper, interrupted only by an outbreak of Asiatic cholera in the summer of 1832, to which succumbed large numbers of the predominantly Irish laborers.

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In the fall of 1833, the canal was opened to traffic from Trenton to Kingston, with the entire canal opened for through navigation in May 1834. Formal dedication took place on June 25, 1834, with elaborate ceremonies attended by Governor Peter Vroom, including an inspection of the canal by barge, starting from the terminal at Bordentown and passing through Trenton, concluding with speeches and a celebration at New Brunswick.

In a report to stockholders by the Joint Board of Directors on the completion of their works (not submitted until January 29, 1840), the canal was described as follows:

"The works of the Delaware and Raritan Canal Company commenced opposite Bull's Island, at Black's Eddy, in the Delaware river (sic), 22 1/2 miles above the city of Trenton, and run thence along the river to Trenton, thence westwardly 6 miles, to the Delaware river (sic) at Bordentown; and from Trenton eastwardly 37 miles to the Raritan river (sic) at New Brunswick - the whole length being 65 1/2 miles; uniting the tidewaters of New York and Philadelphia; ..."

Of the Deep Lock at New Brunswick, the Joint Report of 1840 stated "... the works have been so arranged as to be able to use the surplus water to drive machinery. At the ordinary summer height of the Raritan, the whole of its waters can be turned into the canal, and used here with a fall of fourteen feet...The New Brunswick Manufacturing Company have agreed for all the surplus water at that place."

Originally estimated by White to cost \$1,168,130.64, the canal was reported in 1834 to have cost \$2,829,797.36, with more work to be done. In 1840, the final cost of the original construction was placed at \$2,844,103 by the Joint Directors.

As the volume of tonnage transported on the canal increased, improvements became necessary and desirable. Originally, barges on the Delaware and Raritan were mule or horse drawn, as on other American canals of that period. Under the leadership of Commodore Stockton, the company was the first in the United States to introduce mechanically propelled barges and, by 1850, had a substantial fleet of steam tugs in service.

Operation of the screw propeller ships at four mile per hour speeds began to erode the banks, necessitating installation of riprap to a depth of 3.5 feet below water surface, accomplished in 1853. At the same time, locks were increased in length from 110 to 220 feet clear, permitting the locking through of two boats at the same time. Bridges on the main canal were also widened to 48 feet, permitting simultaneous passage of two barges.

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The previous year (1852), the main canal had been dredged throughout its length to a depth of eight feet. Another modification pursued by Chief Engineer Welch was the replacement of the upper miter type lock gates, as needed by drop gates. In 1868, steam winches were installed to open and close lock gates and to pull barges into and through the locks.

Heavy equipment and supplies of all types for the Grand Army of the Potomac were transported on the canal throughout the Civil War years, with Union gunboats frequently observed in transit. During the record-breaking years of 1866-1871, following the war, the movement of traffic was 90 percent eastbound. In the peak year of 1871, coal from the Pennsylvania fields in the Lehigh Valley and Reading areas made up 80 percent of the 2,990,000 tons moved on the canal. Other cargo included iron ore, sand, cement, fertilizer, timber and farm products.

Except for sightseers, there was little passenger traffic on the canal. Through passengers travelled by way of the Camden and Amboy Railroad, as did lighter or "fine" cargo. On June 30, 1871, in the middle of its most profitable year, the properties of the Joint Companies were leased by the Pennsylvania Railroad for 999 years. Thereafter, the canal fortunes declined.

By 1893, the Pennsylvania Railroad had expanded the double track to a four-line track between New Brunswick and Trenton. At the same time, having no interest in continuing canal operations, the railroad raised canal tolls, while simultaneously lowering rail freight charges on the identical goods. Unable to withstand such competition, the canal failed to show an operating profit after 1900.

The next important usage of the canal, as freight movement subsided, was the transit by pleasure yachts beginning about 1920. The canal offered a safe and pleasant passage for boats between the two great yachting centers of Long Island Sound and Chesapeake Bay. In 1921, a total of 941 pleasure crafts utilized the canal. However, so excessive were the tolls (\$27 each way for even the smallest craft) and so uncertain the passage because of indifferent lock tenders and rundown equipment, that even this traffic declined, to the evident satisfaction of the railroad. The canal closed for the season in December 1932 and ceased to function as a transportation link.

Early in 1933, the Pennsylvania Railroad and the United New Jersey Railroad and Canal Company filed certificates of abandonment with the New Jersey Secretary of State. Although the Court of Chancery directed the railroad to continue to operate and maintain the canal, the State created the Delaware and Raritan Canal Commission on April 11, 1933, to determine the feasibility of State operation. In 1934, the State of New Jersey took over the canal and, in the same year, began to sell water to industrial users.

In May 1948, the Division of Water Policy and Supply, Department of Conservation, completed plans for the reconstruction of Deep Lock and its conversion from navigational use to a spillway for water supply control purposes. Such is its use today, on the eve of its demolition for freeway construction. The facing stone of the lock will be used in the restoration of the outlet locks, some 1.67 miles downstream.

PART II - DESCRIPTIVE INFORMATION

A total of 14 locks were located along the main canal between Bordentown and New Brunswick. Of these, seven locks lifted barges a total of approximately 57 feet between Bordentown and the summit level at Trenton. From the State Street Lock in Trenton, the canal ran level to the Kingston Lock, from which location seven additional locks provided for the drop of 56 feet to tidewater at New Brunswick.

The canal from Black's Eddy to Trenton was designed principally to assure a constant and reliable source of water to the main canal, although it also provided for navigation. Water from it flowed by gravity as far east as Five Mile Lock near Bound Brook. Additional water requirements were obtained from the Raritan River. The "feeder canal" was of smaller cross-section than the main canal, being 60 feet wide at water surface and 6 feet deep. It contained one navigation lock located at Lambertville which was constructed of "hammered dressed masonry."

The main canal was built to a width of 75 feet at water surface with one on two side slopes. Though constructed for nine feet of water, normal depth in operation was seven feet. Locks were of cut stone masonry laid with hydraulic cement. They were 110 feet between gates and 24 feet wide; the entire lock length from the head to the lower end of the wing walls being 162 feet. An exception to this was the outlet lock at New Brunswick which was 30 feet wide and 130 feet between gates, with an overall length of 185 feet. A second outlet lock, 24 feet wide by 217 feet long, was constructed lying parallel to the first in the period 1866-1871.

The downstream entrance guide walls and the lock chamber walls for approximately one-half of their length at the downstream end are in generally good condition, with masonry walls exposed. The upstream end of the lock is closed by a reinforced concrete weir, in excellent condition, with three submerged vertical-lift control gates. The masonry walls of the upper end of the lock chamber are protected with a two-inch gunite covering.

The lock chamber is approximately 24 feet by 221.5 feet clear, with 281.3 feet overall length and lift of 12.2 feet.

The foundations are constructed of 15-inch thick floor logs supporting 3x12-inch flooring, with a 3x12-inch timber sheet piling about six feet long driven around entire perimeter as stop-waters. Walls of cut stone with exposed face block approximately 48 inches long by 36 inches wide by 18 inches thick, maximum size.

The lock gates and guard gate were of timber, but no traces of gates or their hardware exist. The timber lock wall sheathing has also disappeared.

The site is urban commercial and well-maintained.

For more information, see

Delaware and Raritan Canal: Lock	HABS No. NJ-713
Delaware and Raritan Canal: Lock Tender's House	HAER No. NJ-60-B
Delaware and Raritan Canal: Outlet Locks	HAER No. NJ-61

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